POSITIONING | IDENTIFICATION | VERIFICATION | MEASUREMENT | FLAW DETECTION

TELEDYNE DALSA
A Teledyne Technologies Company

BOA | BOA IDR | BOA PRO

BOA™

FLEXIBLE SMART CAMERA TECHNOLOGY

Get more vision

BOA vision system

COMPLETE VISION SYSTEM

Teledyne DALSA's BOA products are highly integrated vision systems in a tiny smart camera package specifically designed for industrial use. Complete with choice of application software embedded, BOA offers manufacturers a robust and flexible automated inspection system that is easy to integrate and deploy on the factory floor.

BOA VISION SYSTEMS COMPRISE ALL OF THE ELEMENTS OF AN INDUSTRIAL MACHINE VISION SOLUTION:

- Sensor (640x480 to 1600x1200)
- Light Control
- Processing – CPU/DSP/FPGA
- I/O – Expandable via PL-200
- Factory communications
- Developer and Operator application interfaces
- Protective Enclosure

READY TO DEPLOY WITH CHOICE OF APPLICATION SOFTWARE

BOA vision systems are available in 3 different software configurations.

BOA

The standard product is offered with our iNspect application software. Ideal for both new and experienced users alike, iNspect's comprehensive library of tools and functions can be quickly set-up to satisfy a multitude of common inspection tasks

BOA IDR

The IDR version is offered with a subset of iNspect tools that apply only to Identification, Tracking and associated Verification applications. BOA IDR is a good choice for manufacturers who need to inspect product markings for correctness or traceability.

BOA Pro

The Pro version is offered with our coveted Sherlock application software. Ideal for vision integrators, Sherlock provides the flexibility and tools to tackle the diverse range of applications across all industrial segments.

MODEL	EMBEDDED SOFTWARE	SENSOR RESOLUTION						
		640x480 MONO	640x480 COLOR	1024x768 MONO	1024x768 COLOR	1280x960 MONO	1280x960 COLOR	1600x1200 MONO
BOA	iNspect	x	x	x	x	x	x	x
BOA IDR	iNspect IDR	x		x		x		x
BOA PRO	Sherlock	x	x	x	x	x	x	x

TYPICAL APPLICATIONS

- Pattern Matching
- Precision Measuring
- Identification (1D/2D/OCR)
- Robot Guidance
- Flaw Detection
- Color Verification

VERSATILE, RUGGED AND RELIABLE

BOA's small rugged enclosure and 360° mounting capabilities allow it to integrate easily into existing production lines, machinery or moving equipment. Rated for IP67 deployment, BOA can be installed in harsh or wash down factory environments knowing that heat, vibration or moisture will not affect performance. An optional cover is available that screws over the C mount lens for these applications.

IP67 ENCLOSURE
360° MOUNTING
C MOUNT LENS
PROTECTIVE LENS COVER

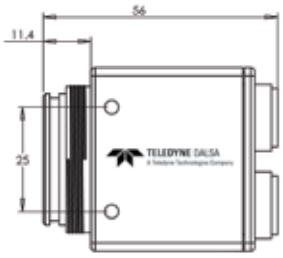
VISUAL LED INDICATORS
M12 FACTORY CABLES
EXTERNAL LAMP CONTROL
PASSIVE POE

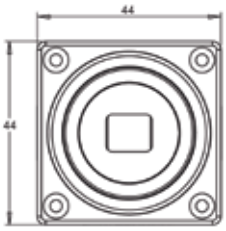
INTEGRATION

BOA provides standard industrial Ethernet protocols for integrating into the factory network, including support for popular PLC's such as Rockwell Automation and Siemens. BOA ensures that data is moved quickly and accurately with minimal integration effort.

In addition to Ethernet, BOA provides serial RS-232 and discrete I/O connections, as well as expandable I/O options. A dedicated strobe output is provided for direct light control.

HARDWARE SPECIFICATIONS





SPECIFICATION	DEFINITION	
Memory	Storage	256MB
	Program	256MB
Image	Sensor	1/3" to1-1/8" CCD
	Pixel size	4.4 µm to 7.4 µm
	Resolution	640x480, 1024x768, 1280x960, 1600x1200
	Type	Mono or Color Progressive Scan
	Exposure	22 µm to 1000 ms
	Acquisition	Async Reset, full or partial frame integration
		Up to 100 f/s maximum (application dependent partial mode)
	Lens	C Mount (lens cover optional)
	Lamp	Direct connect (Pwr/Gnd/Strobe)
I/O	Trigger	1 opto-isolated input
		Software trigger via Ethernet or internal timer
	Inputs	1 General purpose opto-isolated
		Expandable via PL-200 Module
	Outputs	2 General purpose opto-isolated
		Expandable
	Strobe	1 dedicated strobe output for LED light source
	Status	Network + 2 application assigned LEDs
Serial	RS232	Flying leads from M12 cable
Network	Ethernet	10/100 BaseT (Supports "Passive Power over Ethernet")
Power	Power	12-30V via I/O or Ethernet
Mechanical	Material	Machined Aluminum with anodize/paint finish
	Mounting	8 x M 4 plus optional mounting block
	Size	44mm x 44mm x 56mm (without lens cover)
Environment	Temp	-10°C (14°F) to 50°C (122°F) Operating (-60°C to 80°C Storage)
	Protection	IP67 with cables attached
	Shock	70 G
Certification		FCC Class A and EU CE

BOA

The standard BOA is provided with our intuitive iNspect machine vision software embedded. iNspect's simple setup unleashes the knowledge and algorithms that have been field tested in factories around the world. This flexible application arms 1st time and experienced users alike with the tools and capabilities to satisfy a diverse range of inspection needs.

QUICK SET-UP

GET IMAGE

- SYNCHRONIZE TIMING
- ADJUST LIGHTING AND EXPOSURE
- CALIBRATE COORDINATE SYSTEM

APPLY TOOLS

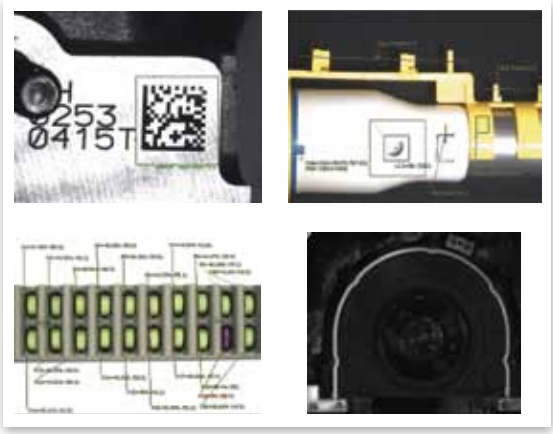
- CLICK AND APPLY INSPECTION TOOLS TO IMAGE
- ASSIGN LOCATORS FOR ALIGNMENT IF REQUIRED
- ADJUST PASS/FAIL TOLERANCES

INTEGRATE

- SETUP COMMUNICATION CHANNEL
- DEVELOP SCRIPTS IF REQUIRED
- CONFIGURE I/O IF REQUIRED

EASY WEB BROWSER SET UP

BOA is configured and monitored remotely using an Ethernet connection to a PC. An inspection can be quickly setup using a web browser portal (Internet Explorer 6 and higher) into the embedded iNspect application. The web server provides a simple user interface for configuration and access to the iNspect application GUI whose client controls are downloaded to the PC when the connection is initially established.



BOA FEATURES

- Easy setup via web browser
- Flexible tool set for most applications
- User Administration control
- Emulator for offline development
- Direct connect to 3rd party interfaces
- Image logging and playback

VISION CAPABILITIES

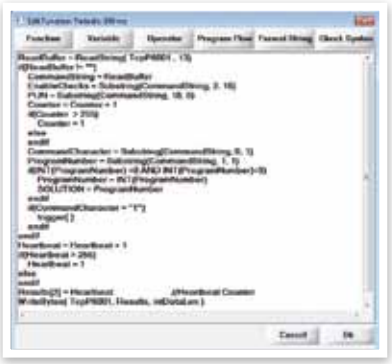
iNspect offers a flexible tool set that is appropriate for most applications. Setting up an inspection is simple - select a tool, construct a ROI on the image, open the tool property page and set pass/fail criteria. Any combination or any multiple of tools can be used in a single inspection. At runtime, the outputs from all tools are formulated to render a decision.

Property pages provide setup and tuning controls for each tool. In addition, image preprocessors can be applied to each ROI to accentuate features of interest.

COUNT TOOL PROPERTY PAGE

iNspect offers a very capable scripting tool. This tool allows users to develop their own programs using predefined or custom functions with tool variables. Scripts can be defined based on external, processing or timed events. This method of programming provides greater flexibility to solve more demanding applications.

The script tool also provides a string editor that allows easy formatting of output strings.



SCRIPT EDITOR

ACCESS ADMINISTRATION

Operator access is an important consideration in factories. iNspect provides the capability to restrict or lockout unauthorized users. Similarly, for highly controlled manufacturing environments, such as drug packaging, it is also required to log access and any changes made to the system. iNspect provides the ability to log user access and change information to a secure drive on the company network.

FACTORY INTEGRATION

iNspect supports digital I/O, serial and Ethernet communications for interfacing 3rd party equipment, operators and the factory enterprise. Compatible protocols, such as Modbus and Ethernet /IP provide standard languages for connecting complementary factory devices. Image logging functions are available for storing runtime images to a network device.

Teledyne DALSA is proud to be an encompass partner of Rockwell Automation.

OFF-LINE DEVELOPMENT

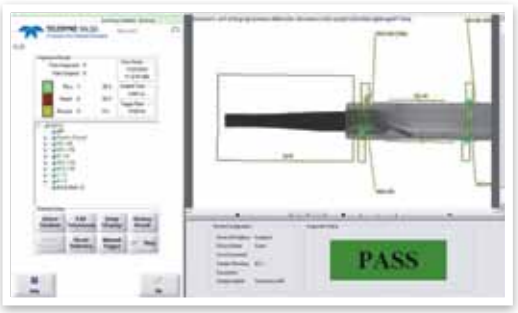
iNspect provides a full-featured emulator for offline solution development and debugging. The emulator runs using images stored from the BOA camera. A solution developed in the emulator can be uploaded and run on the camera.

MULTI-LANGUAGE

The standard operator interface provided with the product is available in various languages such as English, Chinese, French, Italian, Japanese and Spanish.

RUNTIME INTERFACE

BOA cameras run autonomously at runtime and are not typically connected to a PC client. However, in cases where it is desirable to monitor inspection results visually, iNspect offers a runtime screen with a generic operator look and feel. Some custom controls are provided.

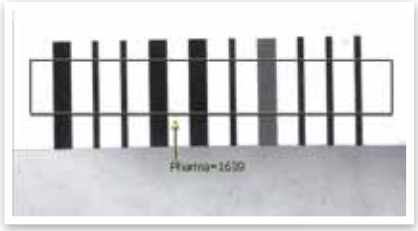


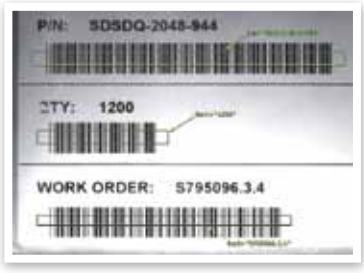
BOA IDR

ID READER AND VERIFICATION TOOL

BOA IDR offers a version of iNspect software that has been streamlined for identification and tracking applications. It provides tools for barcode, character and pattern identification or verification. BOA IDR allows manufacturers to combine these core tools to ensure that all product markings are correct when they leave the factory floor.

1D BARCODE VALIDATION



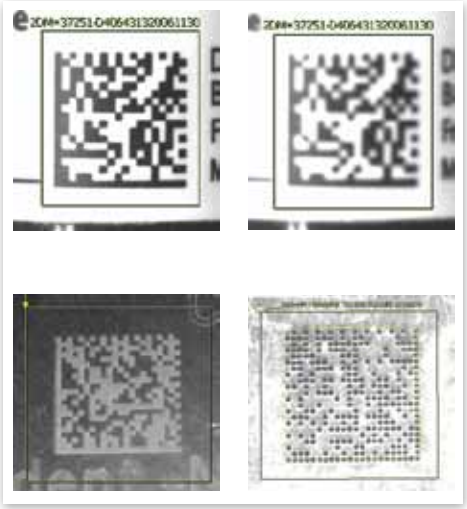


UPCA, UPCE, EAN8, EAN13, CODE39, CODE93, CODE128, CODABAR, BC412, ITF, POSTNET, PLANET, PHARMACODE, GS1, RSS-14, GRADING TO ISO 15416

EASY TO SET UP, READY TO RUN

The preloaded IDR application can be quickly setup and deployed using a standard web browser interface. No software installation is necessary, except for the fully functional emulator that supports offline development and debugging.

2D MATRIX VALIDATION AND VERIFICATION



DATA MATRIX, QR CODE, MICRO QR, PDF417
LEARN MODE FOR DIFFICULT TO FIND CODES
GRADING TO AIM DPM, ISO 16022, ISO 15415

FLEXIBLE INTEGRATION

BOA IDR offers all of the integration capabilities that are available in the standard iNspect software. This includes discrete I/O, RS-232 and Ethernet supported factory protocols such as Modbus and Ethernet/IP. In addition, BOA IDR supports the iNspect scripting tool for advanced integration needs.

BOA IDR FEATURES

- Easy web browser setup
- Flexible tool set for codes, characters and patterns
- User administration controls for CFR Part 11 validation
- Multiple display options
- Remote inspection monitoring via Ethernet
- Emulator for offline development

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BOA IDR APPLICATIONS

- Part validation and verification (1D, 2D)
- Part traceability (1D, 2D)
- Error proofing (2D, OCR, Pattern)
- Date, lot, product code validation (OCR)
- Printed text verification (OCR, Pattern)
- Label presence and placement (Pattern)
- Label validation (1D, 2D, OCR)
- Cap presence and placement (Pattern)
- Pattern verification (Pattern)
- Tamper proofing (Pattern)
- Robot guidance (Pattern)

PATTERN VALIDATION AND VERIFICATION

AREA AND EDGE BASED PATTERN RECOGNITION,
REPORTS SCORE (% MATCH), LOCATION AND ROTATION
FIND FEATURES FOR VERIFICATION OR ALIGNMENT

ACCESS CONTROL

The IDR application software includes user administration tools to help customers achieve system validation for 21 CFR Part 11. This includes password access control and data logging to a complimentary application running on a networked device

PRINTED TEXT VALIDATION AND VERIFICATION

TRAINABLE BINARY AND GRAYSCALE OCR,
DARK OR BRIGHT CHARACTERS FIELDING,
MULTI-LINE SUPPORT, SLANTED TEXT SYMBOLS

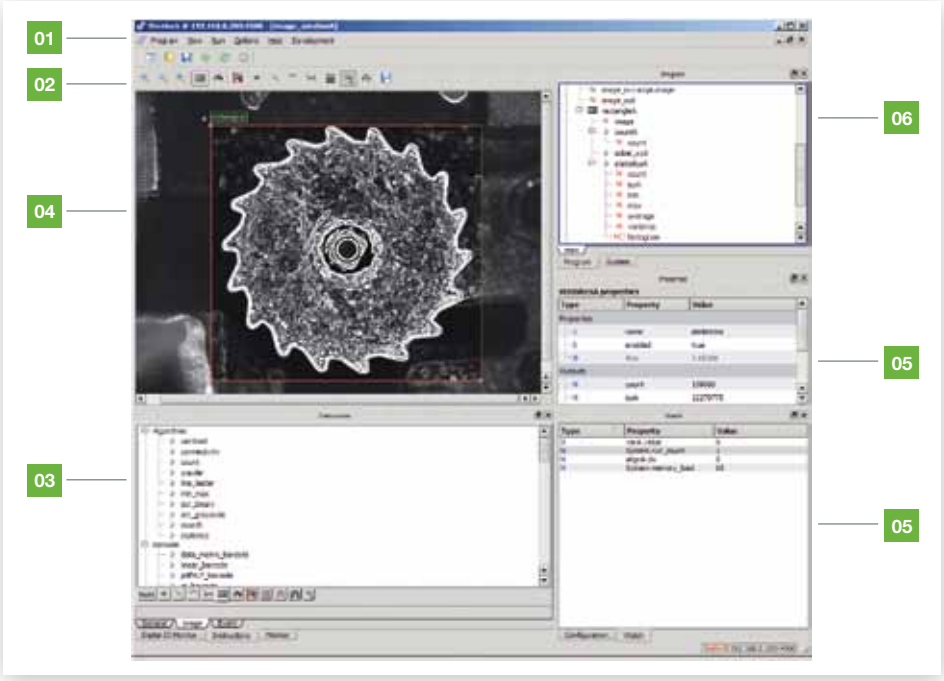
BOA Pro

BOA Pro is supported by Teledyne DALSA's advanced machine vision software Sherlock. A recognized leading software tool with thousands of installations worldwide, Sherlock offers design flexibility and inspection capabilities to satisfy a diverse range of industrial applications. Sherlock's spectrum of applicability allows users to standardize on a single deployment platform to support their current and future inspection needs.

USER INTERFACE

The Sherlock setup interface to BOA Pro is installed on a PC. During development, images from the camera are fed directly to the Sherlock GUI and commands from the program are executed directly on the camera. This methodology optimizes the user design experience whilst providing an accurate representation of runtime performance. A secondary interface is available through a standard web browser for device setup, runtime monitoring and firmware updating.

THE SHERLOCK INTERFACE PANELS CAN BE MOVED AND RESIZED TO SUPPORT CUSTOM LAYOUTS THAT SUIT USER PREFERENCES. PANELS CAN ALSO BE DOCKED WITH OTHER PANELS OR HIDDEN IF NOT REQUIRED. A CONFIGURATION PANEL IS AVAILABLE TO SETUP COMPLEX TOOLS OR EDIT SCRIPTS AND A DIGITAL I/O PANEL CAN BE VIEWED TO PROVIDE VISUAL FEEDBACK OF I/O EVENTS.



01. SOLUTION MANAGEMENT
Open and save solutions, start and stop inspection. Includes single-step debug operations.

02. IMAGE WINDOW CONTROLS
Load, acquire, save and zoom images. Select Region-Of-Interest shapes and apply image preprocessors and algorithms.

03. PROGRAM INSTRUCTION TOOLBAR
Provides quick access to commonly used instructions. These include acquisition, subroutine creation, program steering, conditional statements and scripting.

04. IMAGE WINDOW
Displays image during setup and live image at runtime. Images are acquired from BOA or from image files in emulation mode.

05. PROPERTY/WATCH WINDOWS
These windows provide parametric control and status of program events. All resources in Sherlock have properties, including acquisition, tools and system control.

06. PROGRAM
The program window displays the sequence of instructions or actions that comprise an inspection.

BOA Pro FEATURES

- Advanced setup offers maximum flexibility
- JavaScript based scripting tool
- Support for custom operator interface
- Extensive tool set suits most applications
- Flexible communications
- Full-featured off-line emulator

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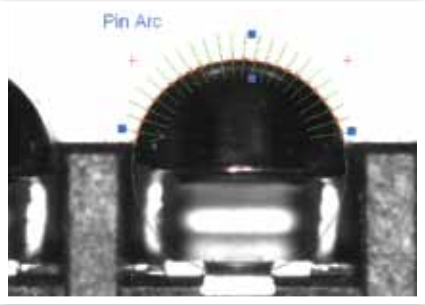
SHERLOCK VISION CAPABILITIES

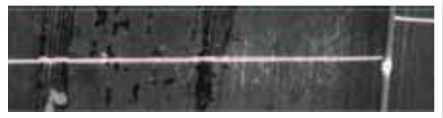
Sherlock provides a comprehensive set of vision tools and capabilities that can be applied to applications across all industries. Sherlock's extensive library of instructions, preprocessors and advanced algorithms can be combined in a variety of ways to solve simple or very demanding tasks. Maximum design flexibility is provided to allow users to customize algorithms, construct scripts and develop operator interfaces.

TOOL FLEXIBILITY

In Sherlock you select a shape to define a Region-Of-Interest (ROI) and then select preprocessors and tools supported by that shape. Each ROI is in effect a self contained processor which can take inputs or generate outputs to other parts of the program.



The arc ROI in this image is used to extract points along the surface of a solder ball on a printed circuit board. These points can be used, for example, to calculate the ball radius or find irregularities along the ball surface.



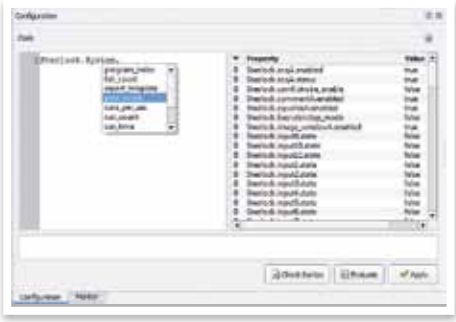
Sherlock offers advanced tools that can, for example, be used to measure the profile of parts such as the placement of protective wrapping on this high-pressure pipe. At the right, a gap in the wrapping is followed by lifting of the wrapping, as shown by the upward step in the reflected points from a laser line.

BEAD TOOL

The bead tool algorithm inspects a bead (thin line) of material. A typical application is inspecting beads of glue that attach gaskets to automotive assemblies.

SCRIPTING

Sherlock's JavaScript based scripting tool, complete with drag and drop instruction editing, allows you to develop custom formulas for in-line and background operations.



MODEL TRAINING

Special tools require you to train models, such as search patterns or character fonts. The configuration panel in Sherlock makes this easy.

COMMUNICATION

Sherlock provides interfaces to a variety of communication mediums and supports standard factory protocols such as Modbus and Ethernet/IP. Image logging is supported via a connected client or by FTP to a network connected drive.

For visualization, Sherlock supports BOAView, a dedicated application supported by WinCE based HMIs, and customer operator interfaces. For the latter, Sherlock provides an OCX control and API that allows users to develop an interface that best suits their factory environment.

USER ADMINISTRATION

There are two access ports into BOA Pro. The first is through the Sherlock interface and the second is through the web browser. Both ports support password protection.

OFF-LINE EDITING

BOA Pro provides a full-featured Sherlock emulator for off-line editing and evaluation.

FIELD PROVEN SOFTWARE

BOA Pro is based on field proven software that has evolved over the course of many years. Thousands of Sherlock installations are deployed in factories around the world to tackle all kinds of inspection needs.

Accessories

BOA is offered with various hardware accessories and software options to assist with factory integration.

PANEL LINK MODULES

Our panel link products provide integration convenience, expandability and protection against incorrect wiring. Panel Link products are DIN mountable and support standard M12 factory cabling to minimize costs. Depending on your application, these modules are designed for single cable applications as well as facilitating Ethernet communication for up to 4 BOA cameras.

PL-100

- Basic I/O module
- Breaks out BOA I/O
- LEDs for visual feedback
- Trigger button for diagnostics
- Offers power on Ethernet for single cable applications

PL-200-IO

- Expansion I/O module
- 8 OPTO Inputs + Trigger
- 8 OPTO Outputs
- 2 OPTO Outputs HS
- 1 OPTO Strobe
- LEDs for visual feedback
- Trigger button for diagnostics
- Offers power and I/O protection to BOA

PL-200-E

- Network switch
- 1 LAN port (no power)
- 1 BOA port (with power)
- 3 LAN ports configurable for std LAN or BOA
- Offers convenient connection between BOA(s) and 3rd party resources

PL-200-IOE

- Convenience package
- Includes PL-200-E and PL-200-IO

CABLES

BOA is electrically interfaced to the factory through standard M12 cables. Full functionality is achieved using 3 cables:

Ethernet	M12-8M to RJ45
I/O	M12-8M to open
Lamp or Serial	M12-5M to open

Single cable configurations are possible by supplying power inside the Ethernet cable. We call this “passive power over Ethernet”. The PL-100 or the PL-200-E are recommended for these configurations.

COVERS & MOUNTING

Lens protector covers are available that screw directly over the lens. These covers protect the device from moisture during wash down applications and offer protection against tampering or accidental lens adjustment. Lens covers have replaceable polycarbonate windows and come in two sizes.

BOA provides mounting holes on each surface of the camera. Use of 2 holes is normally adequate to secure the camera. Mounting brackets are also available to secure the camera horizontally and vertically if needed.

LIGHTING OPTIONS

Application lighting needs vary considerably making it impossible to develop a “one size fits all” solution. For this reason we opted to support external lighting for BOA. The 5-pin lamp connector on the camera can supply 24V power and strobe control to most popular LED light sources. For users who prefer an integrated light solution, we provide a few options that mount directly to the camera.

VISUALIZATION OPTIONS

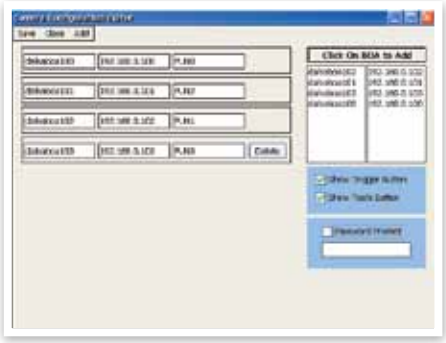
BOA hardware does not provide a direct connection to a display. Runtime visualization, if required, has to be performed by software over Ethernet. To help facilitate this need, Teledyne DALSA provides the following options:

IDISPLAY APPLICATION

iDisplay is a complementary Win32 program that can be installed on a compatible machine residing on the same local area network as the BOA cameras. Once installed, it will discover BOA vision systems and allow you to display up to 8 devices. iDisplay is only compatible with the standard or IDR versions of BOA

BOAVIEW APPLICATION

BOAView is a licensed application that runs on compatible WinCE based HMIs, such as Advantech, Allen Bradley and Siemens. BOAView can display from up to 6 BOA cameras. BOAView includes a configuration utility for discovering and selecting cameras for display.



IMONITOR APPLICATION

The iNspect software offers a generic runtime display, called iMonitor, that is accessible through the web browser interface. This application provides image and results to the operator, but it is only available on the BOA and BOA IDR models.

CUSTOM DISPLAY

Users that have very specific display requirements have the option of developing their own operator interface. All versions of BOA offer an API and examples to help with this development. BOA Pro is more advanced and offers an ActiveX control.

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